

REMARKS

Claims 1-10, 14-20, and 23-35 were previously pending in this application. By this amendment, Applicant is canceling claims 1-9 without prejudice or disclaimer. Claims 10, 29 and 30 have been amended. New claim 37 has been added. As a result claims 10, 14-20, 23-35, and 37 are pending for examination with claims 10, 16, 25, 29, 30, 34 and 37 being independent claims. No new matter has been added.

Summary of Telephone Conference with Examiner

The Applicant thanks the Examiner for the courtesy of the telephone interview held with the Applicant's representative, Mr. Gary S. Engelson, Reg. No. 35,128, on May 25, 2005. Mr. Engelson and the Examiner discussed *Zarnowski*, and various approaches to overcome *Zarnowski*. This amendment reflects the proposals discussed.

Objections to the Drawings

The drawings have been objected to and corrections required. The Applicant respectfully traverses the Examiner's objection to the drawings as follows.

The Examiner identifies the voltage V_{DD} as a reference sign required to be shown in Figs. 1-3, with which it has been mentioned, however, the voltage V_{DD} is simply one value that may be assumed by the node identified by reference sign 235. On page 12, cited by the Examiner for the use of the term V_{DD} , the description notes that the voltage V_{RD} at node 235 may assume a value of V_{DD} , or may assume a lower value. It is further noted that the gate of transistor 230, labeled by reference sign RESET, may assume a value of V_{DD} , but again does not mandate that value. The voltage V_{DD} is clearly understood by those skilled in this art as one of several supply voltages used in CMOS integrated circuits.

In view of the foregoing, no amendment to the drawings is required, and none has therefore been made.

Rejections Under 35 U.S.C. §102

Claims 20, 26-28, and 30 were rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,633,029 to Zarnowski et al. (hereinafter *Zarnowski*). Claims 20 and 30 have been amended, overcoming this rejection.

Claim 20 has been amended to recite:

wherein said sampling circuitry provides a feedback path defined from the output of the differential input transistor pair to a second input of said differential input transistor pair of each of said pixel circuits, and

wherein said sampling circuitry includes a sample and hold circuit within the feedback path having an input coupled to receive a signal from the output from the differential input transistor pair and sample the received signal, and having an output coupled to transfer the sampled signal to the second input of said differential input transistor pair.

The amendatory language clearly defines a sample and hold circuit within the feedback path defined around the sampling circuitry and the differential input transistor pair. In contrast, *Zarnowski* does not disclose a sample and hold circuit. Even if one were to assume that there is a sample and hold circuit within the CDS block of *Zarnowski*, a point not conceded by the Applicant, but rather raised by the Examiner's rejection, the CDS block of *Zarnowski* is entirely outside of the feedback path defined around the amplifier circuit of *Zarnowski*. Therefore any hypothetical sample and hold circuit in the circuit of *Zarnowski* cannot be read on by the language quoted above. Claim 20 is therefore not anticipated by *Zarnowski*.

Claims 26-28 are dependent claims that are not anticipated by *Zarnowski* for at least the same reasons as explained above in connection with claim 20, from which they ultimately depend.

Claim 30 has been amended to recite:

a feedback loop amplifier circuit having said photo sensing node voltage as one input and producing an output, and a sample and hold circuit having an input coupled to receive the amplifier circuit output and the sample and hold circuit having an output coupled to transfer a sampled value to a second input of the feedback loop amplifier circuit, to form a feedback path containing the sample and hold circuit in feedback path.

As with claim 20, the amendatory language of claim 30 clearly defines a sample and hold circuit within the feedback path defined around the sampling circuitry and the differential input transistor pair. In contrast, *Zarnowski* does not disclose a sample and hold circuit. Even if one were to assume that there is a sample and hold circuit within the CDS block of *Zarnowski*, a point not conceded by the Applicant, but rather raised by the Examiner's rejection, the CDS block of *Zarnowski* is entirely outside of the feedback path defined around the amplifier circuit of *Zarnowski*. Therefore any hypothetical sample and hold circuit in the circuit of *Zarnowski*

cannot be read on by the language quoted above. Claim 30 is therefore not anticipated by *Zarnowski*.

Accordingly, withdrawal of this rejection is respectfully requested.

Rejections Under 35 U.S.C. §103

Claims 1-9 have been rejected under 35 U.S.C. §103(a) as unpatentable over U.S. Patent No. 6,570,617 to Fossum et al. (hereinafter *Fossum*) in view of U.S. Patent No. 6,438,276 to Dhuse et al. (hereinafter *Dhuse*). Claims 1-9 have been cancelled, rendering this rejection moot.

Claims 10, 17, 19 and 29 have been rejected under 35 U.S.C. §103(a) as being unpatentable over *Fossum* in view of *Zarnowski*. Claims 10 and 29 have been amended, overcoming this rejection.

Claim 10 has been amended to recite:

an amplifier circuit having an output and having a differential input transistor pair circuit with said photo sensing node voltage as a first input and with a feedback signal as a second input; and

a sample and hold circuit having an input coupled to the output of the amplifier circuit, and having an output; a clamping circuit coupled to the output of the sample and hold circuit and having an output carrying a signal representing a double correlated sample voltage difference at said photo sensing node;

wherein the feedback signal is received by the second input of the amplifier circuit from the output of the sample and hold.

There is no teaching, in either reference applied, either alone or in combination, of the feedback connection now explicitly defined by the claim language of amended claim 10. *Fossum* does not show the combination of the sample and hold with the amplifier, connected as shown, and as discussed above in connection with the rejections under §102, *Zarnowski* does not offer any relevant teaching with respect to the feedback connection explicitly recited by this claim. Claim 10 is therefore patentable over the combination applied.

Claims 17 and 19 are dependent claims, patentable for at least the same reasons as given above in connection with claim 10, from which they ultimately depend.

Claim 29 has been amended to recite:

providing a sample and hold circuit with an input coupled to selectively receive the amplifier output of a said pixel amplifier circuit in the array, the sample and hold circuit being controlled by a first control signal input and producing an output signal;

coupling the sample and hold circuit output to a second input of the differential amplifier within a feedback loop.

There is no teaching, in either reference applied, either alone or in combination, of the feedback connection now explicitly defined by the claim language of amended claim 29.

Fossum does not show the combination of the sample and hold with the amplifier, connected as shown, and as discussed above in connection with the rejections under §102, *Zarnowski* does not offer any relevant teaching with respect to the feedback connection explicitly recited by this claim. Claim 29 is therefore patentable over the combination applied.

Accordingly, withdrawal of this rejection is respectfully requested.

Claims 14 and 18 have been rejected under 35 U.S.C. §103(a) as being unpatentable over *Fossum* in view of *Zarnowski* and further in view of U.S. Patent No. 6,421,085 to Xu.

Claims 14 and 18 are dependent claims, allowable for at least the same reasons as discussed above in connection with claim 10, from which they ultimately depend.

Accordingly, withdrawal of this rejection is respectfully requested.

Claim 15 has been rejected under 35 U.S.C. §103(a) as being unpatentable over *Fossum* in view of *Zarnowski* in view of *Xu* and further in view of U.S. Patent No. 6,137,535 to Meyers.

Claim 15 is a dependent claim, allowable for at least the same reasons as discussed above in connection with claim 10, from which it ultimately depends.

Accordingly, withdrawal of this rejection is respectfully requested.

Claims 23, 32, and 35 have been rejected under 35 U.S.C. §103(a) as being unpatentable over *Zarnowski* in view of *Xu*.

Claim 23 depends from claim 20. There is no teaching, in *Zarnowski* or *Xu*, either alone or in combination, of the feedback connection now explicitly defined by the claim language of amended claim 20. Claim 20, and consequently dependent claim 23, is therefore patentable over the combination applied.

Claims 32 and 35 depend from claim 30. There is no teaching, in *Zarnowski* or *Xu*, either alone or in combination, of the feedback connection now explicitly defined by the claim language of amended claim 30. Claim 30, and consequently dependent claims 32 and 35, are therefore patentable over the combination applied.

Accordingly, withdrawal of this rejection is respectfully requested.

Claim 24 has been rejected under 35 U.S.C. §103(a) as being unpatentable over *Zarnowski* in view of *Xu* and further in view of U.S. Patent No. 6,753,912 to Wayne.

Claim 24 is a dependent claim, allowable for at least the same reasons as discussed above in connection with claim 20, from which it ultimately depends.

Accordingly, withdrawal of this rejection is respectfully requested.

Claim 32 has been rejected under 35 U.S.C. §103(a) as being unpatentable over *Zarnowski* in view of *Wayne*.

As previously discussed, claim 32 is a dependent claim, allowable for at least the same reasons as discussed above in connection with claim 30, from which it ultimately depends.

Accordingly, withdrawal of this rejection is respectfully requested.

Claim 33 has been rejected under 35 U.S.C. §103(a) as being unpatentable over *Zarnowski* in view of *Wayne* and further in view of *Meyers*.

Claim 33 is a dependent claim, allowable for at least the same reasons as discussed above in connection with claim 30, from which it ultimately depends.

Accordingly, withdrawal of this rejection is respectfully requested.

New Claim

New claim 37 has been added to more fully define the Applicant's contribution to the art.

Claim 37 recites:

a sample and hold circuit having an input coupled to receive the photo signal and which alternately samples and holds on one storage element in a time sequence, a sample of the photo signal representative of incident light intensity and a sample of the photo signal representative of a reference black level; and
an output circuit having an input coupled to receive from the sample and hold the time sequence of samples and having an output representative of a difference between the incident light intensity and the reference black level.

Conventional CDS art does not show the sequential sampling of the photo signal representative of incident light intensity and then of the photo signal representative of a reference black level, as recited in this claim. Nor does conventional CDS art show an output circuit which computes a difference between sequential input signals, having an input coupled to receive from the sample and hold the time sequence of samples and having an output representative of a difference between the incident light intensity and the reference black level. The claimed structure has, among other advantages over the conventional art, the advantage of requiring only one sample and hold circuit, thus avoiding the need to match components between

separate sample and hold circuits used to obtain the photo signal representative of incident light intensity and to obtain the photo signal representative of a reference black level.

Allowable Subject Matter


Applicant thanks the Examiner for the indication of allowability of claims 16, 25 and 34.

CONCLUSION

In view of the foregoing amendments and remarks, reconsideration is respectfully requested. This application should now be in condition for allowance; a notice to this effect is respectfully requested. If the Examiner believes, after this amendment, that the application is not in condition for allowance, the Examiner is requested to call the Applicant's attorney at the telephone number listed below.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicant hereby requests any necessary extension of time. If there is a fee occasioned by this response, including an extension fee, that is not covered by an enclosed check, please charge any deficiency to Deposit Account No. 50/2762.

Respectfully submitted,
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